Logistics Battle Command (LBC) Model

TRAC-LEE, in partnership with TRAC-MTRY and Argonne National Laboratory, developed LBC as a general modeling framework for studying alternative logistics systems and concepts. The model considers logistics units, supplies, decisions, and tasks as entities and events that move and occur across networks over time. As such, LBC does not model the physical environment, line of sight, detection, engagements, or damage in the manner of an entity level combat simulation. Rather, LBC models consumption, supply requests, resupply decisions, convoys and similar logistical system entities and events.

LBC is a closed loop, discrete event simulation, written in Java. It uses Simkit as its event manager. This provides a very flexible and general modeling framework. It can be run deterministically or can utilize probability distribution functions and be run iteratively to produce stochastic results. LBC is a very capable logistics distribution analysis tool. It can be used to assess the efficiency and effectiveness of logistics systems, resupply concepts, and/or logistics operations. The LBC model has the ability to represent decision making and logistics planning that results from the implementation of logistics command and control (C2) enablers designed to improve the situational awareness (SA) of decision makers. It also represents the ability of decision makers to use the enhanced SA to modify logistics operations during simulation run time. The LBC model contains the Dynamic Maintenance (DM) module, a reliability and maintainability module based on a set of complex maintenance spreadsheets and AMSAA's System of Systems Availability Model (SoSAM). In stand-alone mode, DM uses basic operating tempo (OPTEMPO) information and mean time between system aborts to determine reliability failures and build maintenance queues. Based on parts availability, maintenance man-hour (MMH) requirements and the availability of mechanics and lift, it determines how long it takes to repair the platforms and can calculate the operational availability for a specific type or family of platforms.

LBC uses layers of "networks" (a grouping of nodes and arcs) to represent the various components of a scenario. Distribution and transportation networks provide the capability to distribute supplies. A simple communications network provides the ability to pass SA data and orders to execute operations. Logistics activities are represented as a task network. This key feature is one of the things that make this model unique and powerful. Every activity has been broken down into individual tasks. Each of those tasks can be represented as a node in a network linked together in the order that they are to be performed and each with a time delay based on whatever factors are appropriate. By using this arc-node representation of activities, we can represent the entire set of preplanned logistics activities for a scenario as a network. This task network can be changed or modified during model run time. LBC also has the ability to represent the impact of threat actions against resupply operations in terms of attrition of transportation assets belonging to convoys. The functionality is enabled by embedding an "Attrition" activity into the task network.

LBC provides a modeling architecture that allows substantial flexibility without making major changes to core model code. Because of its flexible design, the model is scalable which

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makes it equally suitable for high resolution brigade and below analyses or more aggregated, lower resolution, corps/theater level analysis. Once the required data is obtained, a scenario can be entered into the model in weeks as opposed to months.   And any of the input variables or parameters can be varied using design of experiment methodologies to provide results over a range of values quickly and with minimal user manipulation.

LBC POC:
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